

Work Order ID 83184

\*83184\*

Page 1

April-13-12 12:59:01 PM

Item ID: D412-664-203

Accept

\*N900040100\*

Setup Start \*NS1\*

Revision ID:

Item Name: Crosstube Aft

Stop \*NS2\*

Start Date: 13/04/2012 Start Qty: 1.00

\*1\*

Cust Item ID:

Required Date: 27/04/2012 Req'd Qty: 1.00

\*1\*

Customer:

Reference:

Approvals:

Process Plan: MLJ

Date: 12/04/13 Tooling:

Date:

Run Start \*NR1\*

QC:

Date:

SPC (Y/N):

Date:

Stop \*NR2\*

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
Draw Nbr	Revision Nbr								
D412-664-243	E/DEO								

100

\*100\*

DOCUMENT CONTROL

0.00

DC

Memo

0.00

Document Control

Photocopy bluefile and create labels as per PPP D412-664-203 CHG 008

*8/10/15*

*MLJ 12-5-15*

110

\*110\*

Packaging

0.00

Packaging

Memo

0.00

Packaging

*Tw*

*12-4-25*

*P to →*

120

\*120\*

BENDING MACHINE - CROSSTUBES

0.00

CNC Bend 2

Memo

0.00

CNC Alpha 160 Bender

Bend tube as per Dwg D412-664-243 using CNC bender program 412-aft and Folio FT010

*MO/TW*

*12-4-30*

W/O: 83184

## WORK ORDER CHANGES

DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: D412-664-203 PAR #: \_\_\_\_\_ Fault Category: x-tube NCR: Yes ☒ No ☐ DQA: OK Date: 12/05/13  
 Resolution: use as-is Disposition: use as-is QA: N/C Closed: OK Date: 12/5/13

NCR: 1211431

## WORK ORDER NON-CONFORMANCE (NCR)

DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			
12.05.02	120	CRUSHING IS OVER TOLERANCE	<u>PS/642</u> 12.05.02	Acceptable per attached <u>SR</u>	<u>N/A</u>	<u>OK</u> 12/05/10	<u>PS/642</u> 12.05.02	<u>OK</u> 12/05/10

NOTE: Date &amp; initial all entries

# Work Order ID 83184

**\*83184\***

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Item ID: D412-664-203

Accept

**\*N900040100\***

Setup Start **\*NS1\***

Revision ID:

Item Name: Crosstube Aft

Stop **\*NS2\***

Start Date: 13/04/2012 Start Qty: 1.00 **\*1\***

Cust Item ID:

Required Date: 27/04/2012 Req'd Qty: 1.00 **\*1\***

Customer:

Reference:

Approvals: Process Plan: \_\_\_\_\_ Date: \_\_\_\_\_ Tooling: \_\_\_\_\_ Date: \_\_\_\_\_

Run Start **\*NR1\***

QC: \_\_\_\_\_ Date: \_\_\_\_\_ SPC (Y/N): \_\_\_\_\_ Date: \_\_\_\_\_

Stop **\*NR2\***

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
130 <b>*130*</b> QC Quality Control	QC15- Crosstube Dimensional Check  Memo	0.00 0.00							
140 <b>*140*</b> Crosstubes Crosstubes	Crosstubes  Memo 1-Drill pilot holes in tube as per Dwg D412-664-243 using drill Jig DT8550 & DT8551 and drill table DT8577 using #9 holes as per QSI 10 to install towers.  2-Ream hole to finish size in tube as per Dwg D412-664-243 using drill Jig DT8550 & DT8551. Check dimensions between holes, both sides on both cuffs, to ensure alignment with saddle holes.  3-SCRIBE PART # & BATCH #  4-Deburr & Inspect for surface damage. Repair damage within limits as per Dwg D412-664-243	0.00 0.00							

*Rm*  
*12-5-1*

*Tu*  
*12-5-1*

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries

# Work Order ID 83184

April-13-12 12:59:01 PM

**\*83184\***

Page 3

Item ID: D412-664-203

Accept

**\*N900040100\***

Setup Start **\*NS1\***

Revision ID:

Item Name: Crosstube Aft

Stop **\*NS2\***

Start Date: 13/04/2012 Start Qty: 1.00 **\*1\***

Cust Item ID:

Required Date: 27/04/2012 Req'd Qty: 1.00 **\*1\***

Customer:

Reference:

Approvals: Process Plan: \_\_\_\_\_ Date: \_\_\_\_\_ Tooling: \_\_\_\_\_ Date: \_\_\_\_\_

Run Start **\*NR1\***

QC: \_\_\_\_\_ Date: \_\_\_\_\_ SPC (Y/N): \_\_\_\_\_ Date: \_\_\_\_\_

Stop **\*NR2\***

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
150	Crosstubes Chemical Conversion	0.00							
<b>*150*</b>									
HandFXtube	Memo	0.00							
Hand Finishing Crosstubes									
160	QC3- Inspect Part Finish	0.00							
<b>*160*</b>									
QC	Memo	0.00							
Quality Control									
170	QC5- Inspect part completeness to step on W/O	0.00							
<b>*170*</b>									
QC	Memo	0.00							
Quality Control									

POSITIVE RECALL

EFFECTIVE 12-05-01 AUTH W crashy

RELEASED AD DATE 12-05-02

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries

# Work Order ID 83184

April-13-12 12:59:01 PM

**\*83184\***

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Item ID: D412-664-203

Accept

**\*N900040100\***

Setup Start **\*NS1\***

Revision ID:

Item Name: Crosstube Aft

Stop **\*NS2\***

Start Date: 13/04/2012 Start Qty: 1.00 **\*1\***

Cust Item ID:

Required Date: 27/04/2012 Req'd Qty: 1.00 **\*1\***

Customer:

Reference:

Approvals: Process Plan: \_\_\_\_\_ Date: \_\_\_\_\_ Tooling: \_\_\_\_\_ Date: \_\_\_\_\_  
QC: \_\_\_\_\_ Date: \_\_\_\_\_ SPC (Y/N): \_\_\_\_\_ Date: \_\_\_\_\_

Run Start **\*NR1\***

Stop **\*NR2\***

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
180	Outsource process - NDT per QSI038 4.1	0.00							
<b>*180*</b>									
Outsource2	Memo	0.00							
Outsource process - NDT	Liquid Penetrant Inspection as per QSI 038 Or Issue P/O: <u>16903</u> as per ASTM 1417 Level 2 Attach copy of NDT results to work order								
190	Packaging	0.00							
<b>*190*</b>									
Packaging	Memo	0.00							
Packaging	Inspect for transit damage Ensure copy of NDT results attached to work order.								
200	QC5- Inspect part completeness to step on W/O	0.00							
<b>*200*</b>									
QC	Memo	0.00							
Quality Control	Inspect for damage & ensure results are as per Dwg D412-664-203								

112-05-4

1x 12-5-4

12.05.04 (1)

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries





W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries



W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries

# Work Order ID 83184

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**\*83184\***

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Item ID: D412-664-203 Accept **\*N900040100\*** Setup Start **\*NS1\***  
 Revision ID: Stop **\*NS2\***  
 Item Name: Crosstube Aft  
 Start Date: 13/04/2012 Start Qty: 1.00 **\*1\*** Cust Item ID:  
 Required Date: 27/04/2012 Req'd Qty: 1.00 **\*1\*** Customer:  
 Reference:

Approvals: Process Plan: \_\_\_\_\_ Date: \_\_\_\_\_ Tooling: \_\_\_\_\_ Date: \_\_\_\_\_ Run Start **\*NR1\***  
 QC: \_\_\_\_\_ Date: \_\_\_\_\_ SPC (Y/N): \_\_\_\_\_ Date: \_\_\_\_\_ Stop **\*NR2\***

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
250	Pick Kit	0.00							
<b>*250*</b>									
Packaging	Memo	0.00				1X			SD 12-5-15
Packaging									
260	QC4- 100% Inspect kits for completeness	0.00							
<b>*260*</b>									
QC	Memo	0.00				⊕			
Quality Control									
270		0.00							
<b>*270*</b>									
Packaging	Packaging	0.00				⊕			12/5/15
Packaging	Memo								
Packaging	Identify and pack for shipping as per PPP D412-664-203								
	*****Ensure tube is not packaged if curing time is less than 12 hrs, see step 27								
	for application time & date *****								
	Time & date of packaging: _____								
	Location: <u>103</u>								

Rev 1

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries

**Work Order ID 83184**

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**\*83184\***

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Item ID: D412-664-203

Revision ID:

Item Name: Crosstube Aft

Start Date: 13/04/2012 Start Qty: 1.00

Required Date: 27/04/2012 Req'd Qty: 1.00

Reference:

Accept

**\*N900040100\***Setup Start **\*NS1\***Stop **\*NS2\*****\*1\***

Cust Item ID:

**\*1\***

Customer:

Approvals: Process Plan: \_\_\_\_\_ Date: \_\_\_\_\_ Tooling: \_\_\_\_\_ Date: \_\_\_\_\_

QC: \_\_\_\_\_ Date: \_\_\_\_\_ SPC (Y/N): \_\_\_\_\_ Date: \_\_\_\_\_

Run Start **\*NR1\***Stop **\*NR2\***Sequence ID/  
Work Center IDOperation  
DescriptionSet Up/  
Run Hours

Tool ID

Tool #

Plan  
CodeAccept  
QtyReject  
QtyReject  
NumberInsp.  
Stamp

280

QC21- Final Inspection - Work Order Release

0.00

**\*280\***

QC

Memo

0.00

Quality Control

12/5/16  
ME  
12-05-14

W/O:		WORK ORDER CHANGES						
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector	

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries



# Picklist Print

April-13-12 12:59:05 PM

Page 1

Work Order ID: 83184

Parent Item: D412-664-203

Parent Item Name: Crosstube Aft

\*83184\*

\*D412-664-203\*

Start Date: 13/04/2012

Required Date: 27/04/2012

Start Qty: 1.00

Required Qty: 1.00

Comments: IPP Rev:E04.02.16Reformat; Added D3189-1K/DS  
 IPP Rev:F 06-03-29 Remove Comments on Pick List JLM  
 IPP Rev:G 06.12.08 per ECN 886 EC  
 IPP Rev:H 07-04-30 As per Rev D JLM  
 IPP Rev:I 08-06-12 add comment in seq. 21 DD verified by:EC IPP rev J  
 11.04.21 DEO D412-664-243-E-1 EC verified DD IPP REV:K  
 11.10.03 DEO D412-664-243-E-2 DD verf:EC

Component Item ID/ Item Name	Replacement Item ID	Mfg/ Purch	Bin Item	Primary Location	Last Location	Route Seq ID	Unit of Measure	Qty on Hand	Qty per Kit	Total Qty	Qty Issued	Date Issued	Status
D412-664-203TRN		Manufactured	No			110	Each	0.0000	1	1			
*D412-664-203TRN*				B83178					**			JW 12-04-25	
Crosstube Turning Detail													
D2896-1		Manufactured	No			230	Each	26.0000	1	1			
*D2896-1*									**			12 05.08	
Support													
			<div> <div># 71502 or 74465</div> <div> <div>Location</div> <div>Loc Qty</div> <div>Loc Code</div> </div> </div>										
				LG052			8						
				80586			8						
				LG053			18						
				74465			18						
D3189-1		Manufactured	No			230	Each	20.0000	2	2			
*D3189-1*									**			12 05.08	
Chafing Shield													
			<div> <div>Location</div> <div>Loc Qty</div> <div>Loc Code</div> </div>										
				FG			4						
				36065			4						
				LG052			16						
				81060			16						

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries

# Picklist Print

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Page 2

Work Order ID: 83184

Parent Item: D412-664-203

Parent Item Name: Crosstube Aft

\*83184\*

\*D412-664-203\*

Start Date: 13/04/2012

Required Date: 27/04/2012

Start Qty: 1.00

Required Qty: 1.00

D3595-063-570

Manufactured No

230

Each

89.0000

2

2

\*D3595-063-570\*

RUBBER CUSHION

\*\*

*m* 12.05.08

Location

Loc Qty

Loc Code

FG

8

37971

1

42243

7

MAT052

81

71534

4

76546

77

MS21920-28

Purchased

No

230

Each

79.0000

4

4

\*MS21920-28\*

Clamp(per MIL-DTL-8783C)

\*\*

*m* 12.05.08

Location

Loc Qty

Loc Code

FG

5

105884

5

LG050

74

116839

2

118713

4

120054

2

120884

16

121067

50

MS21920-30

Purchased

No

230

Each

62.0000

2

2

\*MS21920-30\*

clamp(per MIL-DTL-8783C)

\*\*

*m* 12.05.08

Location

Loc Qty

Loc Code

LG

48

119529

48

LG051

14

111258

14

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Shop Packet Print

Page 2

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries

# Picklist Print

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Page 3

Work Order ID: 83184

Parent Item: D412-664-203

Parent Item Name: Crosstube Aft

\*83184\*

\*D412-664-203\*

Start Date: 13/04/2012

Required Date: 27/04/2012

Start Qty: 1.00

Required Qty: 1.00

AN6-40A

Purchased

No

250

Each

97.0000

4

4

\*AN6-40A\*

Bolt

\*\*

Location

Loc Qty

Loc Code

ST342

97

120187

68

120833

4

121349

25

250

Each

59.0000

2

2

AN6-41A

Purchased

No

\*AN6-41A\*

Bolt

\*\*

Location

Loc Qty

Loc Code

ST342

59

119749

8

120187

1

120423

50

250

Each

0.0000

18

18

AN960JD616

NAS1149D0663J

Purchased

No

\*AN960JD616\*

Washer

MS21042L6

Purchased

No

\*MS21042L6\*

Nut

\*\*

Location

Loc Qty

Loc Code

ST300

782

117677

25

118384

3

118927

48

119075

506

120308

200

250

Each

782.0000

6

6

\*\*

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Shop Packet Print

Page 3

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

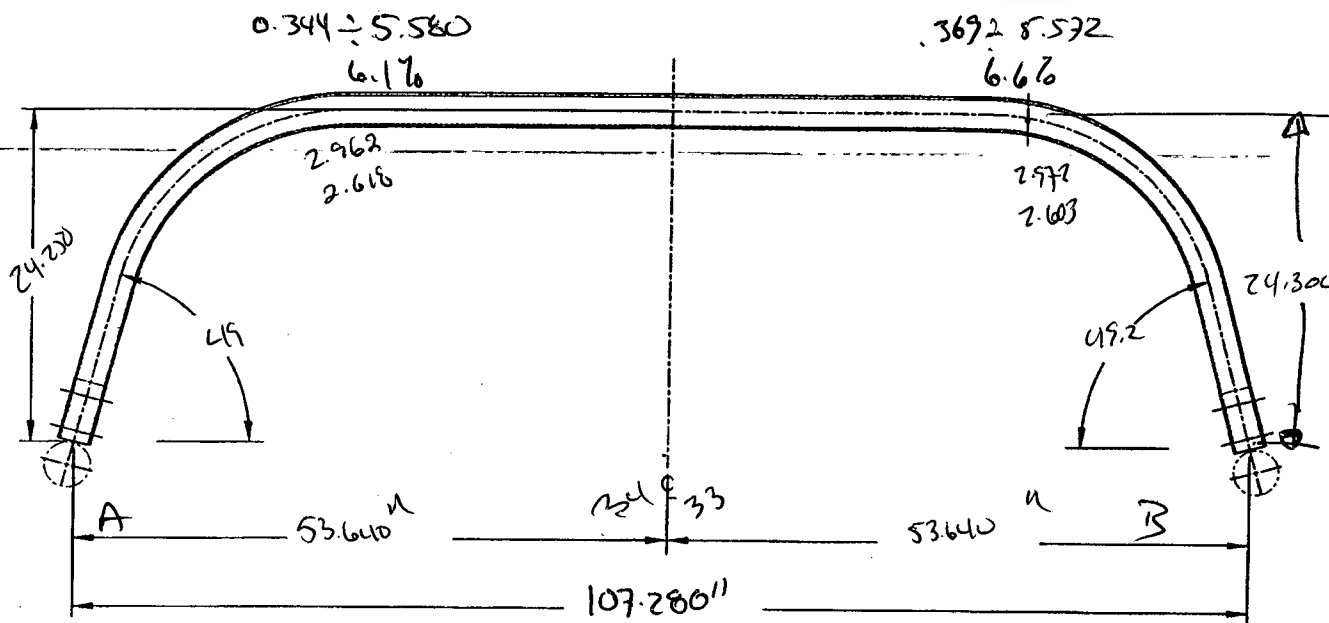
Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries

DART AEROSPACE LTD		Work Order:	83184
Description: Crosstube High Aft (412)		Part Number:	D412-664-203
Inspection Dwg: D412-664-243		Rev: E	Page 1 of 1

Required Dimension	Min	Max
Height	24.24	24.50
1/2 Span	53.59	53.85
Angle	49	52
Total Span	107.18	107.70



Comments
Size A = 6.176 crush @ 34 passes
Size B = 6.676 crush @ 33 passes

QC15 Inspection	8
Date	7/15/02

Rev	Date	Change	Revised by	Approved
A	07.02.06	New Issue	KJ/JM	
B	07.05.08	Dimensions updated per Dwg rev. D	KJ/JLM	
C	10.02.02	Dwg Rev updated	KJ	

# Dart Aerospace Ltd

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

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NOTE: Date & initial all entries



Item	Qty	Part Number	Description
	-243		
1	X	D412-664-243	CROSSTUBE ASSEMBLY (412 HIGH AFT)
2	1	D6009-129	CROSSTUBE
3	2	D3595-063-570	RUBBER CUSHION
4	1	D2896-1	SUPPORT
5	2	D3189-1	CHAFING SHIELD
6	2	D2856-600-1009	ABRASION STRIP
7	4	MS21920-28	CLAMP
8	2	MS21920-30	CLAMP (OR MS21920-32)
9	A/R	MAGNOBOND 6398	ROCKWELL SPECIFICATION RBO-120-023 ADHESIVE (TEXTRON/BELL SPEC. 299-947-100, TYPE II, CLASS 2 ADHESIVE)

**GENERAL NOTES:**

- 1) MATERIAL: MANUFACTURED FROM D6009-129  
FINISHED LENGTH = 124.100±0.020 (BEFORE BENDING/TRIMMING)
- 2) FINISH: CHEMICAL CONVERSION COAT PER DART QSI 005 4.1  
PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2  
PAINT OUTSIDE PER DART QSI 005 4.2
- 3) TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED.
- 4) UNITS: INCHES UNLESS OTHERWISE NOTED.
- 5) BREAK SHARP EDGES: 0.005 TO 0.010 MAX.
- 6) IDENTIFICATION: SCRIBE DART PART NUMBER "D412-664-243" AND BATCH NUMBER ON INSIDE OF CUFF USING VIBRATING STYLUS.
- 7) WEIGHT: 47.0 lbs (PER IIN-D212-664)
- 8) PART IS SYMMETRIC ABOUT CENTERLINE.
- 9) RUN CUTTER OFF PART. BLEND OUT EDGE LONGITUDINALLY, TRANSITION SHOULD BE SMOOTH.
- 10) BEND PROGRESSIVELY WITH A MINIMUM OF 8 PASSES. MAXIMUM TUBE FLATTENING DUE TO BENDING IS 6% BASED ON O.D.
- 11) LIQUID PENETRANT INSPECT OUTSIDE SURFACE OF CROSSTUBE PER QSI 038.
- 12) INSTALL D2896-1 SUPPORT USING 0.03" TO 0.06" THICK LAYER OF MAGNOBOND 6398 TO THE SURFACE OF D2896-1 THAT WILL BE IN CONTACT WITH THE CROSSTUBE PER QSI 015. LET CURE FOR 12 HOURS AFTER INSTALLATION AND PRIOR TO PACKAGING.
- 13) INSTALL MS21920-30 CLAMPS (OR -32) WITH D3595-063-570 RUBBER CUSHIONS TO SECURE THE D2896-1 SUPPORT ON TOP SIDE OF THE CROSSTUBE. ENSURE CLAMPS ARE OPPOSITE OF CROSSTUBE SUPPORT.
- 14) INSTALL D2856-600-1009 ABRASION STRIPS WITH A 0.13 REF GAP ON BOTTOM SIDE OF CROSSTUBE PER QSI 035.
- 15) EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. THE OUTSIDE SURFACE MUST BE SMOOTH AND FREE FROM SURFACE DEFECTS SUCH AS SCRATCHES, NICKS, OR DENTS. DEFECTS UP TO 0.005" MAY BE BLENDED OUT LONGITUDINALLY. CIRCUMFERENTIAL GRIND MARKS ARE UNACCEPTABLE.
- 16) TORQUE CLAMPS 80 TO 100 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING.

SHOP COPY  
RETURN TO  
ENGINEERING  
UNCONTROLLED COPY  
SUBJECT TO AMENDMENT

WITHOUT NOTICE

WORK ORDER

NO. 83184 MCT  
12/04/13

② DEO ATTACHED

RELEASED  
2009-10-29

E	REFORMAT/REVISE GENERAL NOTES; REORGANIZED VIEWS AND REFORMATTED DRAWING TO CURRENT STANDARDS; RELOCATED FLAG #6 PER PAR 08-046 (ZN A6-3); ADD TOLERANCE (ZN B6-3, C4-3, C8-3 & C5-3); MOVED TURNING DETAIL & UPDATED TOLERANCE TO SHEET 4.	RF	09.09.30
D	REMOVE D2732-058, CHANGE TO D3595-063-570	PH	07.03.09
C	REMOVE D2856-600-1087, ADD D2732-058 & MAGNOBOND 6398. MS21920-32 WAS MS21920-30	MB	06.10.27
B	ADD HOLES FOR COMPATABILITY WITH BHT/AA SKIDTUBES	PH	05.02.04
A	NEW ISSUE	PH	01.10.17
REV.	DESCRIPTION	BY	DATE
DESIGN	PH	<b>DART AEROSPACE LTD</b>	
DRAWN	RF	HAWKESBURY, ONTARIO, CANADA	
CHECKED	PH	DRAWING NO.	REV. E
MFG. APPR.	PH	D412-664-243	SHEET 1 OF 4
APPROVED	PH	TITLE	SCALE
DE APPR.	PH	CROSSTUBE ASSEMBLY (412 HI AFT)	NTS
DATE	09.09.30	COPYRIGHT © 2001 BY DART AEROSPACE LTD THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL AND IS SUPPLIED ON THE EXPRESS CONDITION THAT IT IS NOT TO BE USED FOR ANY PURPOSE OR COPIED OR COMMUNICATED TO ANY OTHER PERSON WITHOUT WRITTEN PERMISSION FROM DART AEROSPACE LTD.	

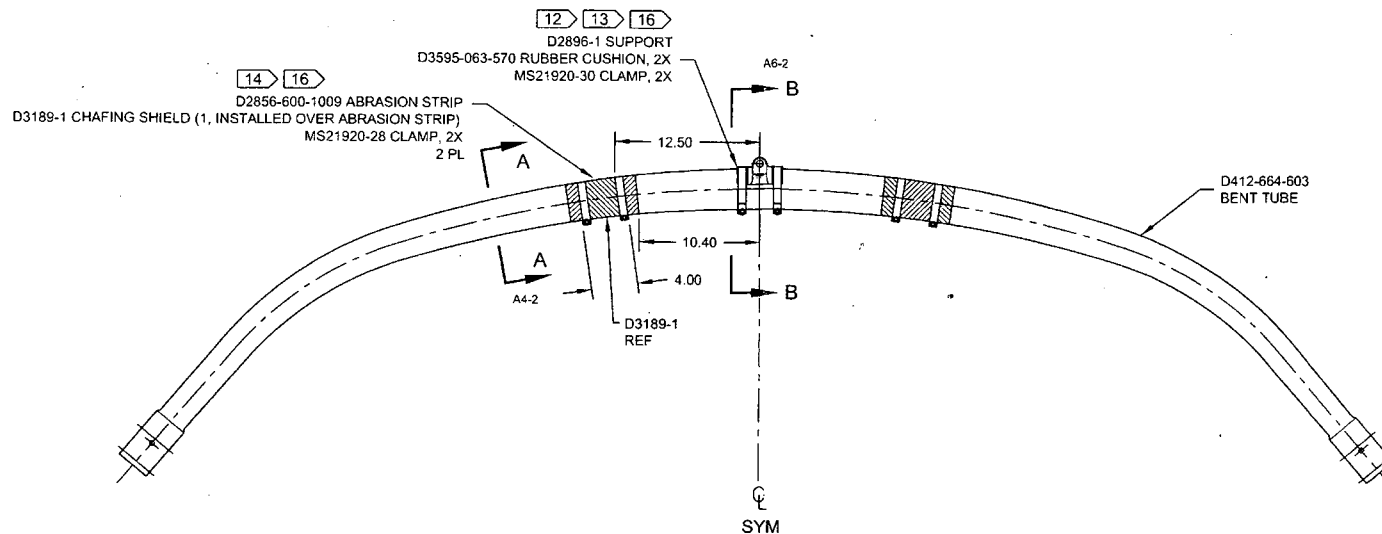
**Dart Aerospace Ltd**

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

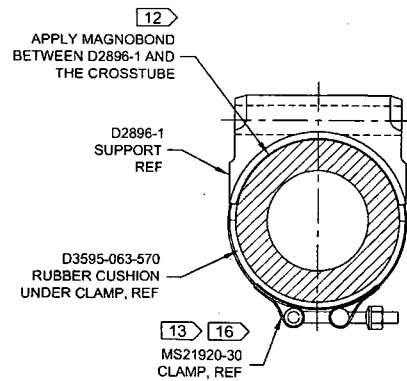
Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_  
 Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

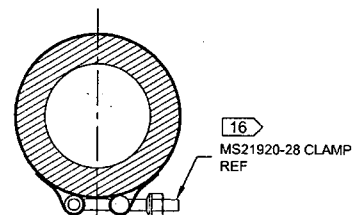
**NOTE:** Date & initial all entries



**D212-664-243**  
**ASSEMBLY DETAIL**



**SECTION B-B** D4-2  
SCALE 4X



**SECTION A-A** C6-2  
SCALE 4X

2 DEO ATTACHED

**RELEASED**  
2009-10-28  
NMP

DESIGN	PH	<b>DART AEROSPACE LTD</b>	
DRAWN	RF	HAWKESBURY, ONTARIO, CANADA	
CHECKED	Q	DRAWING NO.	REV. E
MFG. APPR.	BS	D412-664-243	SHEET 2 OF 4
APPROVED	JP	TITLE	SCALE
DE APPR.	TH	CROSSTUBE ASSEMBLY (412 HI AFT)	NTS
DATE	09.09.30	COPYRIGHT © 2001 BY DART AEROSPACE LTD	
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W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

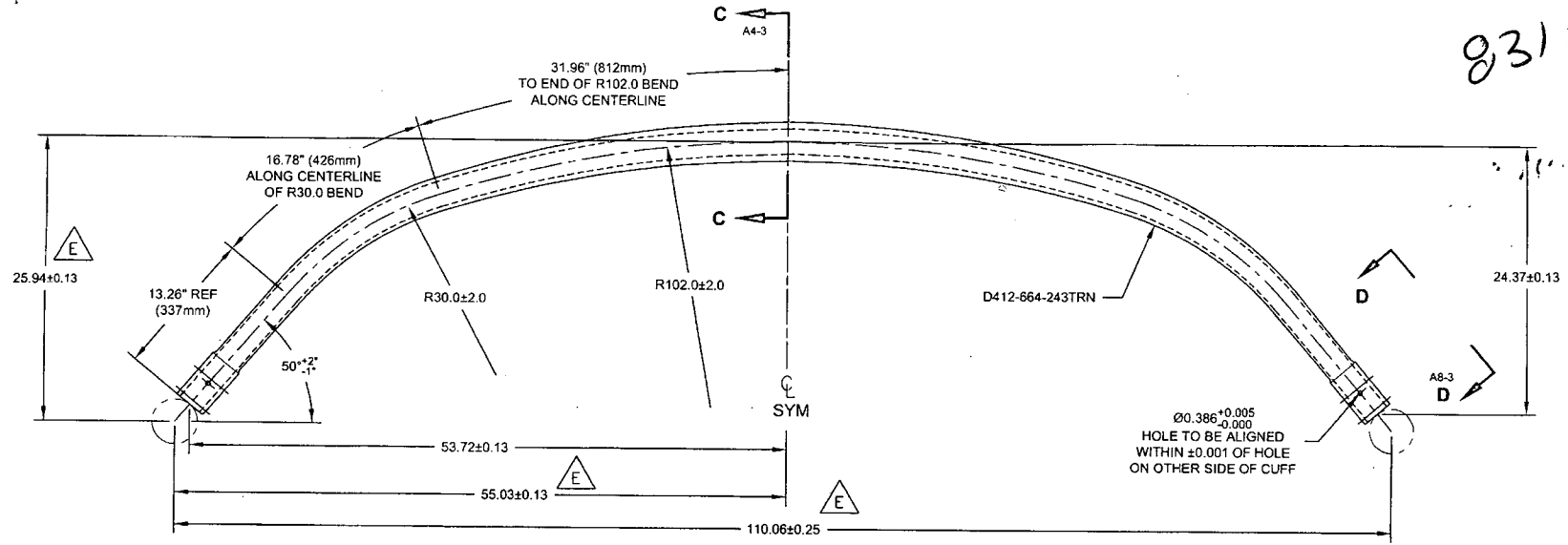
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Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

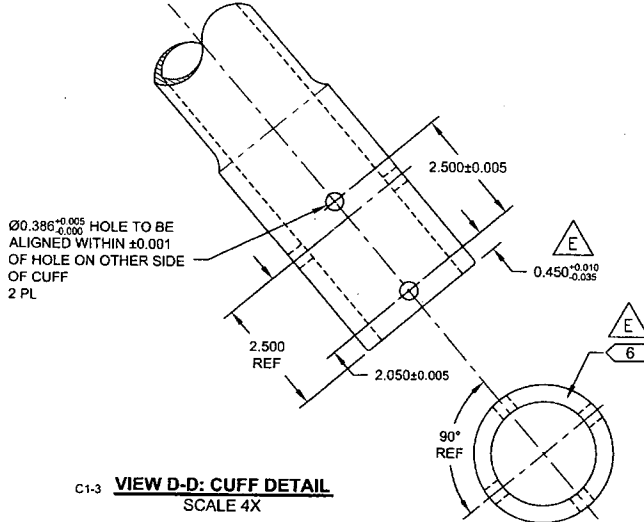
**NOTE:** Date & initial all entries

83184

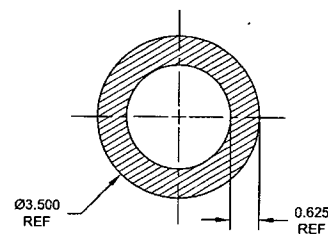


**D412-664-603** 10  
**BENDING AND DRILLING DETAIL** E

② DEO ATTACHED  
**RELEASED**  
 2009-10-29  
 MP



C1-3 **VIEW D-D: CUFF DETAIL**  
 SCALE 4X



**SECTION C-C** D5-3  
 SCALE 4X

DESIGN	PH	<b>DART AEROSPACE LTD</b>	
DRAWN	RF	HAWKESBURY, ONTARIO, CANADA	
CHECKED	QP	DRAWING NO.	REV. E
MFG. APPR.	DS	D412-664-243	SHEET 3 OF 4
APPROVED	AP	TITLE	SCALE
DE APPR.	TH	CROSSTUBE ASSEMBLY (412 HI AFT)	NTS
DATE	09.09.30	<small>COPYRIGHT © 2001 BY DART AEROSPACE LTD          THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL. IT IS SUPPLIED ON THE EXPRESS CONDITION THAT IT IS NOT TO BE USED FOR ANY PURPOSE OR COMMUNICATED TO ANY OTHER PERSON WITHOUT WRITTEN PERMISSION FROM DART AEROSPACE LTD.</small>	

W/O:		WORK ORDER CHANGES						
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector	

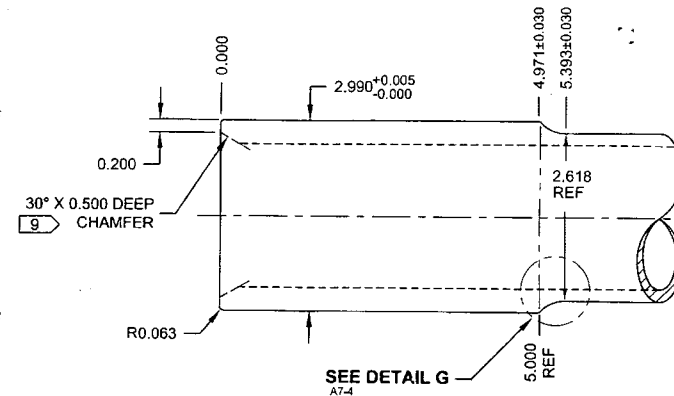
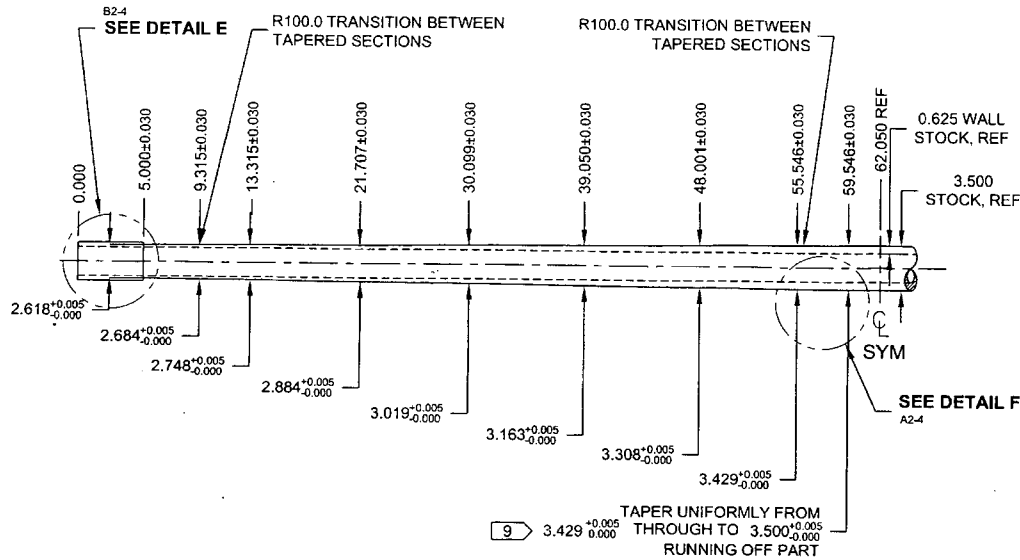
Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

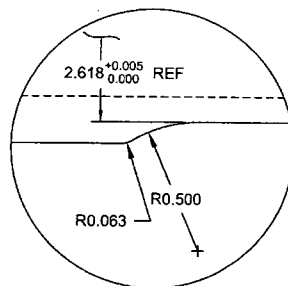
**NOTE:** Date & initial all entries

83184

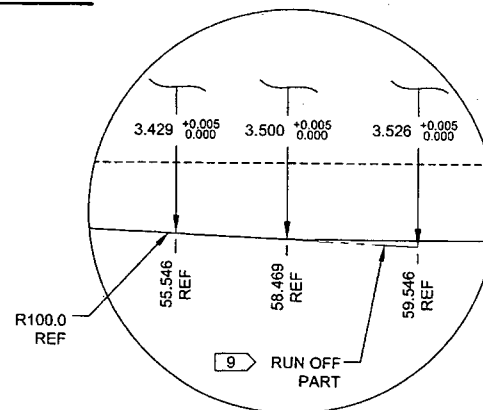


DETAIL E:  
CROSSTUBE CUFF D8-4  
SCALE 5X

**D412-664-243TRN**  
**TURNING DETAIL**



DETAIL G:  
CUFF TRANSITION C2-4  
SCALE 10X



DETAIL F:  
TAPER RUN-OFF C4-4  
NOT TO SCALE

2 DEO ATTACHED

RELEASED  
2009-10-29  
NRP

DESIGN	PH	DART AEROSPACE LTD	
DRAWN	RF	HAWKESBURY, ONTARIO, CANADA	
CHECKED	QD	DRAWING NO.	REV. E
MFG. APPR.	DS	D412-664-243	SHEET 4 OF 4
APPROVED	NP	TITLE	SCALE
DE APPR.	HL	CROSSTUBE ASSEMBLY (412 HI AFT)	NTS
DATE	09.09.30	<small>COPYRIGHT © 2001 BY DART AEROSPACE LTD THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL AND IS SUPPLIED ON THE EXPRESS CONDITION THAT IT IS NOT TO BE USED FOR ANY PURPOSE OR COPIED OR COMMUNICATED TO ANY OTHER PERSON WITHOUT WRITTEN PERMISSION FROM DART AEROSPACE LTD.</small>	

W/O:		WORK ORDER CHANGES						
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector	

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries



DRAWING NO. D412-664-243	TITLE CROSSTUBE ASSEMBLY (412 HI AFT)	REV. E	DART AEROSPACE LTD ENGINEERING ORDER		D.E.O. NO. D412-664-243-E-1	SHEET NO. SHEET 1 OF 2	SCALE NTS
DRAWN	CHECKED	MFG. APPR.	APPROVED	DE APPR.			
DATE 11.03.31	DATE 11/03/31	DATE 11.03.31	DATE 11/03/31	DATE 11.03.31			

**PURPOSE:**

REMOVED ABRASION STRIP IN FAVOR OF A THIN LAYER OF PROSEAL 890.

**CHANGE:**

PARTS LIST IS AMENDED AS FOLLOWS:

**IS:**

Item	Qty -243	Part Number	Description
6	0	D2856-600-1009	ABRASION STRIP

**WAS:**

6	2	D2856-600-1009	ABRASION STRIP
---	---	----------------	----------------

NOTES 2 AND 14, SHEET 1 ARE AMENDED AS FOLLOWS:

**IS:**

- 2) FINISH: CHEMICAL CONVERSION COAT PER DART QSI 005 4.1  
PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2  
MASK UNDERSIDE OF CROSSTUBE AS SHOWN (HATCHED AREA)  
PAINT OUTSIDE PER DART QSI 005 4.2  
AFTER PAINTING, APPLY CLEAR COAT ON HATCHED AREA
- 14) APPLY A THIN COAT OF PROSEAL 890 ON INSIDE CONCAVE SURFACE OF D3189-1  
CHAFING SHIELD AND LET CURE PER MANUFACTURER'S INSTRUCTIONS. INSTALL  
PROSEAL D3189-1 CHAFING SHIELD ONTO CROSSTUBE BY APPLYING A THIN COAT OF  
PROSEAL 890 ONTO CROSSTUBE. BE SURE TO ELIMINATE ANY AIR GAPS.

**WAS:**

- 2) FINISH: CHEMICAL CONVERSION COAT PER DART QSI 005 4.1  
PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2  
PAINT OUTSIDE PER DART QSI 005 4.2
- 14) INSTALL D2856-600-1009 ABRASION STRIPS WITH A 0.13 REF GAP ON BOTTOM SIDE OF  
CROSSTUBE PER QSI 035.

RELEASED  
2011-04-07  
MP

W/O:		WORK ORDER CHANGES						
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector	

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries

DRAWING NO. D412-664-243	TITLE CROSSTUBE ASSEMBLY (412 HI AFT)	REV. E	DART AEROSPACE LTD ENGINEERING ORDER	D.E.O. NO. D412-664-243-E-1	SHEET NO. SHEET 2 OF 2	SCALE NTS
DRAWN <i>[Signature]</i>	CHECKED <i>[Signature]</i>	MFG. APPR. <i>[Signature]</i>	APPROVED <i>[Signature]</i>	DE APPR. <i>[Signature]</i>		
DATE 11.03.31	DATE 11.03.31	DATE 11.03.31	DATE 11.03.31	DATE 11.03.31		

83184

**IS:**

D3189-1 CHAFING SHIELD (1, INSTALLED OVER PROSEAL 890)  
MS21920-28 CLAMP, 2X  
2 PL

**WAS:**

D2856-600-1009 ABRASION STRIP  
D3189-1 CHAFING SHIELD (1, INSTALLED OVER ABRASION STRIP)  
MS21920-28 CLAMP, 2X  
2 PL

D412-664-603  
BENT TUBE

D3189-1  
REF

**D412-664-243  
ASSEMBLY DETAIL**

**RELEASED**  
2011-04-07  
*[Signature]*

2  
MASK AREA PRIOR TO PAINTING AND  
APPLY CLEAR COAT AFTER PAINTING

Q  
SYM

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W/O:		WORK ORDER CHANGES						
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector	

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries

DRAWING NO. D412-664-243	TITLE CROSSTUBE ASS'Y (412 HI AFT)	REV. E	DART AEROSPACE LTD ENGINEERING ORDER		D.E.O. NO. D412-664-243-E-2	SHEET NO. SHEET 1 OF 1	SCALE NTS
DRAWN 97	CHECKED ASS	MFG. APPR. E	APPROVED MP		DE APPR. H		
DATE 11.09.07	DATE 11.09.19	DATE 11.09.19	DATE 11.09.19		DATE 11.09.19		

**PURPOSE:**

REPLACE MAGNOBOND WITH 3M DP460 SCOTCH-WELD EPOXY ADHESIVE

83184

**CHANGE:**

IS:

Item	Qty -243	Part Number	Description
9	A/R	SCOTCH-WELD DP460	EPOXY ADHESIVE, 3M SCOTCH-WELD

WAS:

9	A/R	MAGNOBOND 6398	ROCKWELL SPECIFICATION RBO-120-023 ADHESIVE (TEXTRON/BELL SPEC. 299-947-100, TYPE II, CLASS 2 ADHESIVE)
---	-----	----------------	---

NOTE 12 & 16, SHEET 1 IS AMENDED AS FOLLOWS:

IS:

- 12) INSTALL D2896-1 CENTER SUPPORT USING A 0.04" TO 0.07" THICK LAYER OF SCOTCH-WELD DP460 PER QSI 015. LET CURE FOR 24 HOURS AFTER INSTALLATION AND PRIOR TO PACKAGING.
- 16) TORQUE CLAMPS 80 TO 100 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING. **PRIOR TO PACKAGING, RE-CHECK TORQUE ON CLAMPS AFTER ADHESIVE HAS CURED FOR 24 HOURS.**

WAS:

- 12) INSTALL D2896-1 SUPPORT USING 0.03" TO 0.06" THICK LAYER OF MAGNOBOND 6398 TO THE SURFACE OF D2896-1 THAT WILL BE IN CONTACT WITH THE CROSSTUBE PER QSI 015. LET CURE FOR 12 HOURS AFTER INSTALLATION AND PRIOR TO PACKAGING.
- 16) TORQUE CLAMPS 80 TO 100 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING.

RELEASED  
2011-09-29  
MP

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

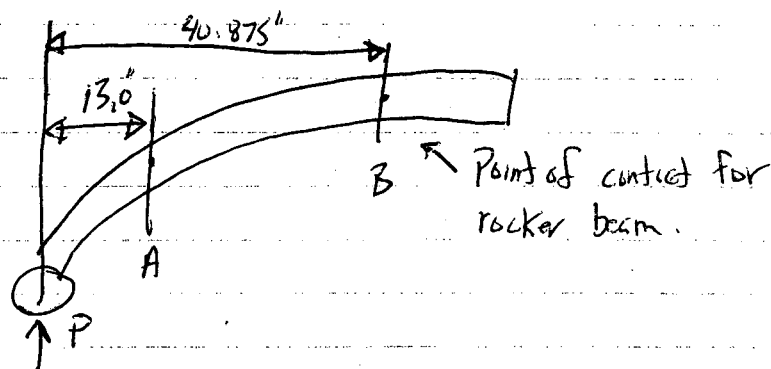
NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries

11.12.06

# CRUSHING OF D412-664-243

Acceptability of 8% CRUSHING AT END OF BEND



Point A:  $OD_1 = 2.961"$ ,  $OD_2 = 2.522"$

$CRUSHING = (2.961 - 2.522) / (2.961 + 2.522) = 8\%$

$I = 1.676 \text{ in}^4$  (from AutoCAD)

Point B:  $OD_1 = 3.307"$ ,  $I = 4.613 \text{ in}^4$

A:  $F = Mc/I = P \times 13 \times 2.961 / 2 \times 1.676 = 11.484 \times P$

B:  $" = P \times 40.875 \times 3.307 / 2 \times 4.613 = 14.651 \times P$

M.S. =  $14.651 / 11.484 - 1 = 0.27$

∴ Tube will break at rocker beam contact before area of 8% crushing, 8% crushing in area at end of tube bend is acceptable

11.12.06







## LIQUID PENETRANT TEST REPORT

P- 05648

CLIENT: DART AEROSPACE DATE: MAY-04-2002 PAGE 1 OF 1  
ATTENTION: LYNDA, CHANTAL, MATT ACUREN JOB No. 188-12-C0121 TIME AM ☒ PM ☐  
ADDRESS: 1270, ABERDEEN ST. PO/WO No. 16903  
HAWKES BURY WORK LOCATION: AS ADDRESS  
ON ACCEPTANCE STD. ASTM1417/45238 REV./DATE 2005  
PROJECT: PT DET FLUORESCENT LIQUID PENETRANT INSPECTION ON 8 "CROSSTUBE" 1 X 1/2" LINE PIPES  
ITEM(S) EXAMINED: - SEE BELOW ELK TUBE

JOB DESCRIPTION: PERFORMED A WET FLOW LPE ON 100% OF THE EXTERNAL SURFACE ON ITEMS MENTIONED BELOW  
PROCEDURE No. LT-002 REV./DATE 2009 TECHNIQUE No. LT-002 REV./DATE 2009  
PART No. 1 MATERIAL ALUMINUM/SUS THICKNESS N/A  
SCOPE: PERFORMED A WET FLOW LPE ON 100% OF THE EXTERNAL SURFACE ON ITEMS MENTIONED BELOW

## TEST DETAILS

METHOD: ☒ FLUORESCENT ☐ VISIBLE ☐ WATER WASH ☐ SOLVENT REMOVABLE ☐ POST EMULSIFIED  
FAMILY BRAND: MAGNAFLUX BLACK LIGHT S/N 13798 ☒ OUTPUT > 1000  $\mu$ W/cm<sup>2</sup> ☐ AMBIENT < 2 fc  
PENETRANT: 2K-67 MINIMUM DWELL TIME 45 MIN. LIGHTING EQUIP. ☐ FLASHLIGHT ☐ TROUBLELIGHT ☐ OUTPUT > 100 fc @ SURFACE  
PENETRANT REMOVER: 1138 MINIMUM DRY TIME >10 MIN. OTHER: OTHER  
DEVELOPER: SKD-82 MINIMUM DWELL TIME 30 MIN. LIGHT METER S/N 1098866 CAL DUE DATE 08/28/12  
DEVELOPER TYPE: ☒ NON AQUEOUS ☐ AQUEOUS ☐ DRY

## TEST SURFACE

SURFACE CONDITION: ☐ AS GROUND ☐ AS WELDED ☐ MACHINED ☐ SHOT BLASTED ☒ CLEAN BARE METAL  
SURFACE TEMPERATURE: ☐ < -4°C/20°F ☐ -4°C/20°F TO 10°C/50°F ☒ 10°C/50°F TO 52°C/125°F ☐ > 52°C/125°F

RESULTS- ( ☐ METRIC ☐ IMPERIAL )

1	ATTACH. B:202 W.O.I.D 83249	✓	ITEM ID	D4137-1 REVID PRELIM
2	TUBE W.O.I.D 83735	✓	ITEM ID	D4138-1 REVID PRELIM
3	CROSSTUBE FWD W.O.I.D 83703	✓	ITEM ID	D206-667-101
4	" FWD W.O.I.D 83702	✓	ITEM ID	D206-667-101
5	" FWD W.O.I.D 83729	✓	ITEM ID	D407-667-105
6	" FWD W.O.I.D 83728	✓	ITEM ID	D407-667-105
7	" AFT W.O.I.D 83184	✓	ITEM ID	D412-664-203
8	" AFT W.O.I.D 83185	✓	ITEM ID	D412-664-203
9	" AFT W.O.I.D 82114	✓	ITEM ID	D407-667-205
10	" AFT W.O.I.D 82113	✓		

NO RELEVANT INDICATION WAS DETECTED AS PER

APPLICABLE STANDARD

12.05.04

## Scope of Services

The agreement of Acuren Group Inc. to perform services extends only to those services provided for in writing. Under no circumstances shall such services extend beyond the performance of the requested services. It is expressly understood that all descriptions, comments and expressions of opinion reflect the opinions or observations of Acuren Group Inc. based on information and assumptions supplied by the owner/operator and are not intended nor can they be construed as representations or warranties. Acuren Group Inc. is not assuming any responsibilities of the owner/operator and the owner/operator retains complete responsibility for the engineering, manufacture, repair and use decisions as a result of the data or other information provided by Acuren Group Inc. In no event shall Acuren Group Inc.'s liability in respect of the services referred to herein exceed the amount paid for such services.

## Standard of Care

In performing the services provided, Acuren Group Inc. uses the degree, care and skill ordinarily exercised under similar circumstances by others performing such services in the same or similar locality. No other warranty, expressed or implied, is made or intended by Acuren Group Inc.

## SIGNATURES

CLIENT REPRESENTATIVE: Matthew Murdoch DTR # E84955  
TECHNICIAN (SIGNATURE): YVES BERSIER SIGNATURE  
NAME (PRINT): YVES BERSIER REPORT REVIEWED BY: NAME INITIALS  
CGSB LEVEL 2 SNT LEVEL 2 CGSB LEVEL 2 SNT LEVEL 2  
CGSB REG. No. 3049 CGSB REG. No. 3049

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CANARY - OFFICE COPY

PINK - TECHNICIAN COPY

GOLD - OFFICE COPY



# Daily Time Report

E-84955

Form dated September 2010

Client: JART AEROSPACE  
Contact: ZKODA, CHANTAC, MATT  
Location: 1370 ABERDEEN ST., HAWKSBURY  
Description: PT WET FLUO  
Report #'s: P-05648

Job #: \_\_\_\_\_  
Day: Sun Mon Tues  
P.O. #: \_\_\_\_\_  
Vehicle #: 636

Date: MAY-04-2012  
Wed Thurs Fri Sat  
W.O #: 188-15-00121  
Camera #: \_\_\_\_\_

Name	Specialist	Tech.	CEDO	Assistant	Start Time	Total Hours			KM	LOA (✓) ONLY	OTM (✓) ONLY	Labour Agreement (if known) or type of work	TLD No.	Daily DRD Readings
						Travel	Worked	SP						
✓ <u>YES</u> <u>DESIGNED</u>	✓				6:00	AM			230	<input type="checkbox"/>	<input type="checkbox"/>		854896	—
						PM				<input type="checkbox"/>	<input type="checkbox"/>			
						3 1/2	3 1/2			<input type="checkbox"/>	<input type="checkbox"/>			
						AM				<input type="checkbox"/>	<input type="checkbox"/>			
						PM				<input type="checkbox"/>	<input type="checkbox"/>			
						AM				<input type="checkbox"/>	<input type="checkbox"/>			
						PM				<input type="checkbox"/>	<input type="checkbox"/>			
						AM				<input type="checkbox"/>	<input type="checkbox"/>			
						PM				<input type="checkbox"/>	<input type="checkbox"/>			
						AM				<input type="checkbox"/>	<input type="checkbox"/>			
						PM				<input type="checkbox"/>	<input type="checkbox"/>			
						AM				<input type="checkbox"/>	<input type="checkbox"/>			
						PM				<input type="checkbox"/>	<input type="checkbox"/>			
						AM				<input type="checkbox"/>	<input type="checkbox"/>			
						PM				<input type="checkbox"/>	<input type="checkbox"/>			

## WELD INSPECTION SUMMARY

Weld Diameter										Long Seam					Circ. Seam				
Schedule/Thickness										Thickness					Thickness				
Quantity										Lineal Ft.					Lineal Ft.				

Film: \_\_\_\_\_  
Pcs. 2 1/4 x 17"  
Pcs. 3 1/2 x 17"  
Pcs. 4 1/2 x 17"  
Pcs. 14" x 17"  
Pcs. \_\_\_\_\_

Re-billable expenses: \_\_\_\_\_

Equipment charges: \_\_\_\_\_

Client Representative: Matt Murdoch

Consumables  
(cans / litres): \_\_\_\_\_ UT 3 PT \_\_\_\_\_ MT

ACUREN 1-877-299-2857

Cambridge, ON (519) 622-3112 • Fax (519) 622-1326  
Cantley, QC (819) 360-0685 • Fax (819)-827-3513  
Cornwall, ON (613) 931-1261 • Fax (613) 931-2777  
Gaspé, QC (418) 392-3618 • Fax (418) 392-4114  
Halifax, NS (902) 443-4448 • Fax (902) 445-5090  
Jonquiere, QC (418) 542-8273 • Fax (418) 542-5494  
Mississauga, ON (905) 673-9899 • Fax (905) 673-8394  
Montreal, QC (450) 492-3399 • Fax (450) 492-5682  
North Bay, ON (705) 840-8107 • Fax (705) 476-6683  
Oakville, ON (905) 825-8595 • Fax (905) 825-8598  
Pickering, ON (905) 839-0015 • Fax (905) 839-5641  
Port Elgin, ON (519) 389-6797 • Fax (519) 389-6799  
St. John's, NL (709) 753-2100 • Fax (709) 753-7011  
Sarnia, ON (519) 336-3021 • Fax (519) 336-8220  
Sherbrooke, QC (819) 620-5456 • Fax (819) 346-6828  
Sudbury, ON (705) 522-1849 • Fax (705) 522-9926  
Thunder Bay, ON (807) 475-4240 • Fax (807) 577-2017  
Timmins, ON (705) 365-8313 • Fax (705) 267-2855  
Val D'Or, QC (819) 856-6789 • Fax (819) 825-9564

NOTES:

# Dart Aerospace Ltd

W/O: 83184		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector
12.05.03	200/ 210	Apply clear coat to entire <del>of</del> outside surface of crastubey except mask off area of support.				CP 12.05.04 051042	

Part No: D412-664-203 PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

